

Section II. (Remarks)

Applicants have amended claims 1, 15 and 25 to recite that each elongated well comprises a single opening that is in fluid communication with the interior space. Support for this terminology can be found in Figure 1.

Affirmation of Prior Election of Invention and Withdrawal of claims 15-24 by Examiner

In the Office Action dated September 16, 2003, Examiner Bueker imposed a restriction requirement under 35 U.S.C. §121 against claims 1-26 and required that an election be made between one of the following groups:

- Group I (claims 1-14 and 25-26), drawn to an apparatus, classified in class 118, subclass 726; and
- Group II (claims 15-24), drawn to a method, classified in class 427, subclass 248.1.

Applicants hereby affirm the prior provisional election of Group I drawn to claims 1-14 and 25-26 made on October 14, 2003.

Correspondingly, applicants acknowledge the withdrawal of non-elected claims from Group II from consideration, with the intent to rejoin these claims at a later time, or alternatively, with reservation of the right to file divisional application(s) directed to the subject matter of those claims if rejoinder is not effected.

Specifically, applicants intend to rejoin the withdrawn method of use claims of Groups II when the elected apparatus claims (as herein amended, and as may subsequently be further amended) are determined to be allowable. Such rejoinder would be fully proper under these circumstances, for the following reasons:

When an application as originally filed discloses a product and the process for making and/or using such product, and only the claims directed to the product are presented for examination, when a product claim is found allowable, applicant may present claims directed to the process of making and/or using the patentable product for examination through rejoinder procedure in accordance with MPEP §821.04, provided that the process claims depend from or include all the limitations of the allowed product claims.

Applicants, therefore, request the Office to take up the non-elected method of use claims 15-24 for examination when the apparatus claims are allowed. Consistent with such intent to rejoin, applicants have amended the method of claims, notwithstanding the Office's withdrawal of such claims, to present them in form suitable for future examination upon their rejoinder with the allowed elected claims.

Rejection of Claims 1-14 and 15-26 and Transversal Thereof

In the January 2, 2004 Office Action:

- (1) claims 1-4, 7-8, 10, 14, 25 and 26 were rejected under 35 U.S.C. §102(a) as anticipated by or, in the alternative, under §103(a) as being obvious over Jurgensen et al. WO 01/61071 (hereinafter "Jurgensen");
- (2) claims 6, 12, and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Jurgensen;
- (3) claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Jurgensen in view of Tanabe et al. U.S. Patent Application Publication Number 2001/0008121 (hereinafter "Tanabe");
- (4) claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Jurgensen in view of Holloway U.S. Patent Number 3,647, 197 (hereinafter "Holloway");
- (5) claims 1-4, 6, 7, 10, 14, 25 and 26 were rejected under 35 U.S.C. §102(b) as anticipated by or, in the alternative, under §103(a) as being obvious over Reed et al. U.S. Patent No. 3,740,043 (hereinafter "Reed");
- (6) claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Reed in view of Barr U.S. Patent No. 2,447,789 (hereinafter "Barr"), Spriggs et al. U.S. Patent No. 3,405,251 (hereinafter "Spriggs"), or Jurgensen;
- (7) claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Reed in view of Tanabe;
- (8) claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Reed in view of Holloway;

(9) claims 12 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Reed;

(10) claims 1-8, 10, 12-14, 25 and 26 were rejected under 35 U.S.C. §103(a) as being unpatentable over Horsky U.S. Patent No. 6,107,634 (hereinafter "Horsky") in view of Barr, Reed, and/or Spriggs;

(11) claim 9 was rejected under 35 U.S.C. §103(a) as being unpatentable over Horsky in view of Barr, Reed and/or Spriggs in further view of Tanabe; and

(12) claim 11 was rejected under 35 U.S.C. §103(a) as being unpatentable over Horsky in view of Barr, Reed and/or Spriggs in further view of Holloway.

These rejections are hereby traversed in respect of the pending claims, as amended herein, and reconsideration of the patentability of these claims is therefore requested in light of the following remarks.

(1) Claims 1-4, 7-8, 10, 14, 25, and 26 were rejected under 35 U.S.C. §102(a) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over PCT Publication WO 01/61071 (Jurgensen et al.). Enclosed and submitted herewith is a Declaration under 37 CFR §1.131 executed by the Matthew Donatucci (Appendix A). The Declaration attests to facts showing completion and possession of the vaporizer delivery system of the instant claimed invention prior to the effective date of the following reference cited in the January 2, 2004 Office Action against the claims previously pending in the application:

<u>Reference</u>	<u>Effective Date</u>
Jurgensen et al.	August 23, 2001

The Declaration includes appended Exhibit 1.

Exhibit 1 is a copy of pages 1-5 of the Invention Disclosure Document on which all dates have been blacked out, but which dates, and the date of the Record of Invention, are prior to the effective date of the Jurgensen reference.

These pages evidence the inventors' conception of the present invention.

Page 1, in the first paragraph thereof, documents “[t]he internal reservoir is made up of many deep, cylindrical wells. The small cylindrical wells dramatically increase the surface area to contact the solid, therefore more decaborane is vaporized.”

Page 1, in the second paragraph thereof, states “[t]he system also has to be heated evenly over its geometry in order to prevent decaborane from condensing in a ‘cold’ spot.” Additionally, page 2, in the second paragraph thereof, discloses “[t]he reservoir block and shut off valve are heated by 10 watt resistors.”

Page 2, in the top portion thereof, contains “[t]he lid and valve, which is one piece, is sealed to the block with a viton o-ring and machine screws.”

Page 2, in the top paragraph thereof, discloses “[a]top the aluminum block is a shut off valve ...which provides good conductance for decaborane flow.”

Thus, exhibit 1, with the enclosed Declaration, provide proof of completion and possession of the vaporizer delivery system of the instant claimed invention comprising a thermally conductive block having a multiplicity of elongated wells, a means for applying heat to the multiplicity of elongated wells, a means for sealing the thermally conductive block, and an outlet for discharge of vapor formed in the vaporizer prior to the effective date of the Jurgensen reference.

Accordingly, applicants respectfully request the withdrawal of the rejection of claims 1-4, 7-8, 10, 14, 25, and 26 under §102(a) as being anticipated by or, in the alternative, under 35 U.S.C. §103(a) as obvious over Jurgensen.

(2) Claims 6, 12 and 13 were rejected under 35 U.S.C. §103(a) as obvious over Jurgensen. However, by virtue of the Declaration under 37 CFR §1.131, submitted herewith, the Jurgensen reference is not competent prior art to defeat the patentability of the presently claimed invention. Thus, applicants request withdrawal of such rejection of claims 6, 12 and 13 under 35 U.S.C. §103(a) over Jurgensen.

(3 and 4) Claims 9 and 11 were rejected under 35 U.S.C. §103(a), based on the combination of Jurgensen with either Tanabe or Holloway. However, with the Declaration under 37 CFR §1.131

operating to remove the Jurgensen reference as prior art to the instant invention, the only remaining references applied against these rejections of claims are Tanabe and Holloway.

Applicants submit that neither Tanabe nor Holloway render applicants' claimed invention *prima facie* obvious.

The present claimed invention in all claims requires the following limitations:

- 1) **elongated wells formed in a thermally conductive block;**
- 2) **a means for applying heat to the elongated wells;**
- 3) **a means for sealing the thermally conductive block;** and
- 4) **an outlet for discharge of vapor formed in the vaporizer.**

According to the Office, Tanabe describes the use of a thermocoupling to measure the temperature of a vaporizer and Holloway describes the use of aluminum as a material for construction of a thermally conductive vaporizer. However, neither Tanabe nor Holloway describe, teach or in any way suggest all the required above-mentioned elements of applicants' claimed invention. Accordingly, applicants respectfully request the withdrawal of such rejections of claims 9 and 11 under 35 U.S.C. §103(a).

(5) Claims 1-4, 6, 7, 10, 14, 25, and 26 were rejected under 35 U.S.C. §102(b) as being anticipated by Reed, or in the alternative, under 35 U.S.C. §103(a) as obvious over Reed.

Applicants' claims have been amended herein to recite that **each of the elongated wells comprises a single opening that is in fluid communication with the interior space;**

Claim 1, for example, recites

1. (Currently amended) A vaporizer comprising:

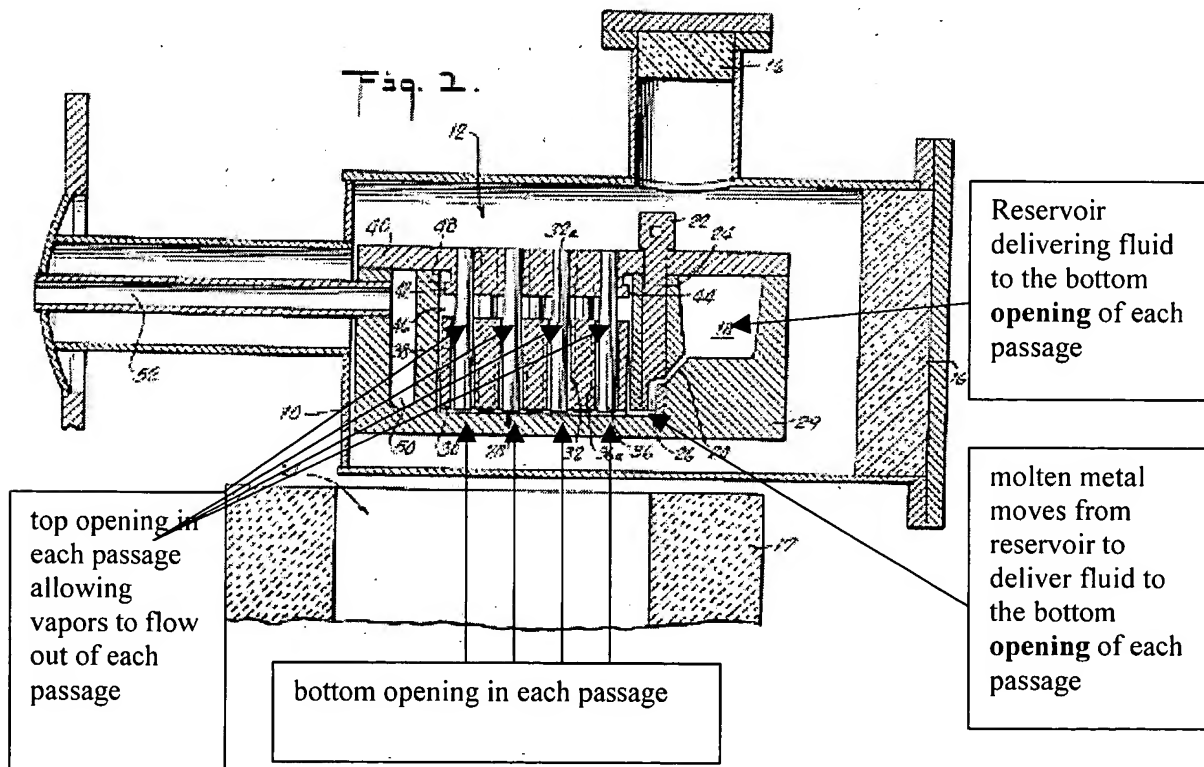
a thermally conductive block having a multiplicity of non-moving elongated wells formed therein for placement of a vapor source material, the multiplicity of elongated wells communicatively connected to an interior space within the thermally conductive block for accumulation of vapor, **wherein each of the elongated wells comprises a single opening that is in fluid communication with the interior space;**

means for applying heat to the multiplicity of the elongated wells within the thermally conductive block;

means for sealing the thermally conductive block; and
an outlet for discharge of vapor formed in the vaporizer.

Thus, claims 1-14 and 25-26, as amended herein, require the elongated wells to have only one single opening.

Reed does not teach or suggest elongated wells that have only one opening. Instead, FIG. 1 of Reed (reproduced below and annotated for ease of understanding) clearly shows the apparatus of Reed has cylindrical passages consisting of a top and bottom opening for introduction of the molten liquid through the bottom opening and removal of vapor through the top opening. Thus, there are two openings per passage -- one for introducing fluid into each passage from the reservoir and one for allowing metal vapor to exit each passage.



Thus, because Reed does not disclose every limitation of applicants' claims, Reed does not anticipate applicants' claimed invention. Accordingly, applicants respectfully request withdrawal of the rejection of claims 1-4, 6, 7, 10, 14, 25, and 26 under 35 U.S.C. §102(b).

The Office further rejected claims 1-4, 6, 7, 10, 14, 25, and 26 under 35 U.S.C. §103(a) as obvious over Reed. Applicants vigorously disagree.

As shown above, Reed describes a vaporizer unit that is used for vaporizing molten metal. One of the objects of the Reed system is to provide for the vaporization of molten metal at a controllable rate (See column 2, lines 25-27). The system comprises a reservoir 18 wherein the metal is heated until it becomes molten and this liquid material is then drained by gravity into the bottom of chamber 28. Chamber 28 includes block 30, which is defined as a multiple of cylindrical passages that pass through the block. These passages have a top and bottom opening that allow for the molten metal, which collects in the bottom of the chamber, to enter the cylindrical passages and move up the passages, to be vaporized and then the vapor escapes through the top openings in the passages. These cylindrical passages must have a top and bottom opening or the molten liquid would not be able to pass into the passages and vaporize therein. Importantly, the block 30 is slightly spaced from the bottom of chamber 28 because as stated in column 4, lines 62-64, this space allows for a thin layer of molten metal to be present on the bottom of the chamber 28 so that a continuous local supply of molten metal is available to enter into the passages 32 in the block.

The Reed system also includes cylindrical fingers 36 that fit into the cylindrical passages. Each finger is slightly smaller in cross-section than the respective passage 32. This placement of the fingers forms a concentric space 38, which is very important in the Reed system. Specifically, as stated in column 5, lines 41-53:

"Forming a plurality of relatively thin shells of fluid metal in the concentric spaces 38 has definite advantages in vaporizing the molten metal. First, the thinness of the shells either reduces the size of vapor bubbles, which form in the molten metal upon heating, or obviates them altogether. Eliminating bubbles from the vapor consequently reduces the liquid inclusions or particles in the vapor. Second, by forming relatively thin shells of fluid, a relatively large surface area is provided for the application of heat to those volumes of fluid, which increases the efficiency of the transfer of heat for vaporization."

Clearly, the cylindrical passages must have a top and bottom opening for passage of the molten metal and these cylindrical passages must also include the disposed fingers therein.

The Reed system further comprises a tortuous path as described in column 6, lines 19-29. As stated in Reed, "after the fluid metal has been heated to generate metal vapor, the metal vapor accumulates in the gap 46 between the protruding section 42 of the plate 40 and the top of the block 30. The metal vapor passes from the gap 46 through an aperture 48 in the crucible 29 into a trap 50, which also may be formed in the crucible. The gap 46, the aperture 48 and the trap 50 form a tortuous path wherein any splatter entrained in the metal vapor is removed therefrom." Thus Reed teaches that all fluids that leave the chamber 28 must navigate through this tortuous path to remove any splatter entrained in the vaporized molten metal.

In operation the Reed system is evacuated to a low pressure and heated by furnace 14. The furnace heats the metal in reservoir 18 and then the molten metal is introduced to chamber 28. The heating may further be accomplished by resistive heating or gas fired tubes as described in column 7, lines 3-5.

According to the Office, applicants' claimed invention is obvious in light of the Reed apparatus. However, the Office has not provided any teaching or motivation in Reed to support this contention or that would provide motivation to completely redesign the Reed apparatus to render obvious applicants' claimed invention, which is an entirely different structure from that of Reed. Moreover, it is incumbent on the Office to provide some suggestion or teaching in the prior art that would lead one skilled in the art to proceed in the direction of applicant's claimed invention. What is the asserted motivation put forth in Reed to replace the cylindrical passages of Reed that have two openings with elongated wells with a closed bottom. Obviously, there is none in Reed, and the Office cannot conjure up this motivation by speculation or conjecture.

Further, where in the Reed reference is there any indication that the Reed system would function as intended if the suspended fingers were removed from the passages of Reed. Clearly, there is no suggestion and the "mere fact that the prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification" *In re Mills*, 16 USPQ2d 1430 (Fed. Cir. 1990) quoting *In re Gordon* 221 USPQ 1125 (Fed. Cir. 1984). It is further stated by the *Mills* Court that "It is not pertinent whether the prior art possesses the functional characteristics of the claimed invention if the reference does not describe or suggest its structure." Thus, this allegedly "obvious" maneuver is supported only by the Office's reinterpretation of the art in light of applicants' disclosure.

In conclusion and in light of the above discussion, Reed does not in any way teach or suggest applicants' claimed invention. As such, the Office has not met its burden of establishing a *prima facie* case of obviousness. Applicants therefore respectfully request reconsideration of the rejection and withdrawal of same.

(6) Claim 8 was rejected under 35 U.S.C. §103(a) as being unpatentable over Reed in view Barr, Spriggs or Jurgensen. According to the Office, Barr, Spriggs and Jurgensen each teach that a resistive heating element can be used to heat a vaporizer and that it would have been obvious to one skilled in the art to heat the vaporizer of Reed by attaching resistive heating to its wall. Applicants submit that none of the proposed combinations render the presently claimed invention as *prima facie* obvious.

Applicants point out that obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention, absent some teaching or suggestion supporting the combination and suggesting the desirability of the combination. Applicants respectfully submit that the Office's statement that "the claimed invention would be obvious to one having ordinary skill in the art" is not sufficient by itself to establish *prima facie* obviousness. According to the Board in *Ex parte Humphreys*, 24 U.S.P.Q. 2D 1255, 1262 (B.P.A.I. 1992) an examiner was wrong in rejecting the claims for obviousness because the examiner's rejection was not **specific** as to how one of ordinary skill in the art would have found it obvious to combine the references. Furthermore, the Board noted the examiner had not explained with any **specificity what areas of the references would suggest the combination**.

This is the circumstance here. The Office has not identified any objective or specific motivation or suggestion in the cited references that would motivate one skilled in the art to combine the references. Thus, the Office seems to be merely reinterpreting the prior art in light of applicant's disclosure, in order to reconstruct applicant's claimed invention, but without any instructional or motivating basis in the references themselves. Such approach is improper and legally insufficient to establish any *prima facie* case of obviousness.

Further, it is incumbent on the Office to view applicant's claimed invention as a whole. *In re Wesslau*, 174 U.S.P.Q. 393 (CCPA 1965). Concurrently, the Office must consider the inventions of any cited references in their respective entireties. Certain individual features from the references may not be arbitrarily chosen (while equally arbitrarily discarding other disclosed features) to merely lump together disparate features of different references as a mosaic in an attempt to meet the features of the rejected

claims. Thus, the Office is not allowed to pick and choose just certain parts of different references and combine them, but instead, the references in **their entirety must be considered**.

As such, the teachings of Barr and Reed must be viewed in their entirety and the Office must recognize that the Barr system describes a crucible that comprises a body member including a multiple of cavities having one closed end for placement and retainment of the source material. Barr further describes a set of resistors for placement above and below the body member for evaporating the source material that is contained within the cavities. Clearly the source material is introduced into the cavities from the top and vaporized source material escape from the same opening after heating by the resistive heating.

In contrast, the Reed system describes heating metal in a reservoir, which is connected to the bottom of chamber 28 via a channel for transference of the molten liquid from the reservoir to the chamber for vaporization within the cylindrical passages. Clearly, the cylindrical passages of Reed have to be open at both ends or the system would not function as intended if at all. Applicants submit that if the systems of the two references are combined, the Reed system will no longer function as intended. For instance, Reed would no longer function as intended if the cylindrical passages were closed at the bottom because the molten metal would no longer be able to move into the passages for vaporization therein. Alternatively, the opened ended passages of Reed would certainly not work in Barr because of the inability to hold source material in the bottom of the individual cavities. Reed also teaches a reservoir to hold the evaporant, which flows to the wells. This is a critical part of Reed's invention -- to have a continuous flow of molten metal evaporant to be delivered to the wells. Barr teaches placing the evaporant directly into each well. If these inventions are combined, where is the evaporant placed? -- in the wells or in the reservoir? What happens to the continuous flow of evaporant? Furthermore, if the entire system of Barr was placed in Reed, how would Reed's reservoir connect to the wells of Barr? Certainly, combining the references would defeat the purpose of the Reed reference. Notwithstanding the adverse outcome by the combination of cited reference, the Office contends that this is exactly what one skilled in the art would do. However, according to the court in *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984), if a proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification.

The Office proposes that the resistive heating system of Barr can be combined with Reed but as stated above, the Office is not allowed to pick and choose certain elements to the exclusion of other elements of a system described in a cited reference. Besides as stated above, Reed already suggested resistive heating but as further stated above, Reed does not render applicants' claimed invention *prima facie* obvious.

Introducing the teachings of Barr does not cure the deficiencies of Reed. As such, applicants request that the rejection of claim 8 under 35 U.S.C. §103(a) be withdrawn.

The Office further proposes the combination of Spriggs with Reed, however this combination suffers from the same deficiencies as that of the proposed combination of Barr and Reed.

For the same above-mentioned reasons in connection with the combination of Reed with Barr, Reed is also non-combinable with Spriggs. The Spriggs system describes a composite of multiple layers including block 12, which is fabricated of a conducting material. Block 12 comprises a multiplicity of cylindrical cavities that are positioned on the upper surface of the block that are filled with the desired powder evaporant. The lower portion of block 12 is provided with a plurality of cavities 22 extending from the sides of the block 12 in directions that are transverse to the evaporant cavities thereabove. Within these transverse cavities is placed electrical heating coils. Thus, the Spriggs system has wells each with only one opening which is in contrast to the wells of Reed that have two openings. Also, Spriggs teaches placing the evaporant directly into the wells while Reed teaches placing evaporant directly into a separate reservoir. Thus, the combination of Reed and Spriggs suffer from the same shortcomings as that of Reed and Barr, namely the proposed combination will render the Reed system inoperable. As such, applicants request that the rejection of claim 8 under 35 U.S.C. §103(a) be withdrawn.

The Office proposed a combination of Reed with Jurgensen. However, the enclosed Declaration under 37 CFR §1.131 operates to remove the Jurgensen reference as competent prior art. Accordingly, applicants respectfully request the Office to remove the rejection of claim 8 under 35 U.S.C. §103(a) over Reed in view of Jurgensen.

(7 and 8) Claims 9 and 11 were rejected under 35 U.S.C. §103(a) as being unpatentable over Reed in view of Tanabe and Holloway, respectively. Applicants submit that the proposed combinations do not render applicants' claimed invention *prima facie* obvious.

The Tanabe reference describes a system with a single cavity 2 for placement of the evaporant wherein this single cavity can be wrapped with a resistive coil. This is in contrast to Reed who discloses multiple passages that are open at the top and bottom for movement of the molten metal therethrough. Applicants question whether the combination of Reed and Tanabe will form a system that includes multiple wells as taught in Reed or will there be only one well as Tanabe teaches? Further, it is unclear whether the wells will have one opening or two. Also, because Tanabe teaches one well having only one opening, how will

the reservoir of Reed interact with the well of Tanabe if these references are combined? Since there is no suggestion in either reference for such combination, the final components of the combined system is merely speculative.

Clearly, the rejection of claim 9 under 35 U.S.C. §103(a) is improper because the proposed combination fails to render applicants' claimed invention obvious. Thus, applicants respectfully request the withdrawal of the rejection of claim 9 under 35 U.S.C. §103(a) over Reed in view of Tanabe.

The Office rejected claim 11 under 35 U.S.C. §103(a) over Reed in view of Holloway and contends that "it would have been *prima facie* obvious to one skilled in the art to use (aluminum) for Reed's thermally conductive vaporizer, because Holloway teaches that aluminum can successfully be used to construct a vaporizer that requires thermal conductivity (January 2, 2004 Office Action, page 5 lines 6-9)."

However, as repeatedly mentioned above, applicants have shown that Reed does not render applicants' claimed invention as obvious for multiple reasons. Further the introduction of using aluminum from Holloway as the material of construction for a thermally conductive vaporizer of Reed does not overcome the deficiencies of the Reed system. Thus, combining Reed with Holloway will not render applicants' claimed invention obvious. Accordingly, applicants respectfully request the withdrawal of the rejection of claim 11 under 35 U.S.C. §103(a) over Reed in view of Holloway.

(9) Claims 12 and 13 were rejected under 35 U.S.C. §103(a) as being unpatentable over Reed. Applicants' claim 12 recites that the thermally conductive block has an interior volume of about 160 cm³ and claim 13 recites that the multiplicity of elongated wells constitute an interior volume of about 60 cm³. According to the Office, "[t]he specific dimensions recited in claims 12 and 13 are considered to be routine operation, and would have been *prima facie* obvious to one skilled in the art in the absence of a showing of unexpected results." The Office's position in essence is that applicants have done nothing more than use routine experimentation to optimize the system. However, conspicuously missing from the record is any substantive evidence that one of ordinary skill in the art would have been motivated to make the modifications of the prior art and select the specific volumes to arrive at applicants' claimed invention. Further, the Office has neglected to show any teaching or suggestion as to why one would choose applicants' claimed volumes from the multiplicity of all possible choices. Clearly, the Office's argument that "routine operation" was involved in determining the optimal volume shows that the Office overlooked the last sentence of 35 USC §103, which states that "[p]atentability shall not be negated by the manner in which the invention was made." *In re Fay*, 146 USPQ 47 (CCPA 1965).

Further, it should be noted that there is no such teaching in Reed and the Office has not provided any evidence that one of ordinary skill in the art would have considered the recited volumes to be desirable in the Reed system. To conclude that the Reed system would be improved by using the recited volumes is merely conjecture on the part of the Office.

Still further, the Office should not lose sight of the fact that Reed **does not teach or suggest elongated wells that have only one opening, as required by applicants' claimed invention.** Instead, Reed describes cylindrical passages consisting of a top and bottom opening for introduction of the molten liquid through the bottom opening and removal of vapor through the top opening. Thus, there are two openings per passage -- one for introducing fluid into each passage from the reservoir and one for allowing metal vapor to exit each passage. As such, Reed does not teach or suggest all the limitations of applicants' claimed invention. Accordingly, applicants request the withdrawal of the rejection of claims 12 and 13 under 35 USC §103(a).

(10) Claims 1-8, 10, 12-14, 25 and 26 were rejected under 35 U.S.C. §103(a) as obvious over Horsky in view of Barr, Reed or Spriggs. Applicants submit that the proposed combinations do not render the presently claimed invention *prima facie* obvious. Horsky describes a vaporizer with a crucible 52 that includes a container 64 enclosing a cavity 66 for containing a source material 68. The system further comprises a heating medium 70 contained in reservoir 54. The heating medium comprises mineral oil or other suitable medium that provides a high heat capacity. The crucible is remotely located from the ionization chamber so that the temperature of the crucible cavity can be controlled to a high degree of accuracy. Also, by maintaining a constant temperature of the vaporized decaborane not only in the crucible but also in route to the ionization chamber, no condensation of thermal decomposition of the vapor occurs. As stated in column 6, lines 3-5, precise temperature control is more critical at the crucible, to control the pressure of the crucible and thus the vapor flow rates out of the crucible.

According to the Office:

"Horsky does not disclose the use of a block having wells formed therein for holding the evaporant. Barr (Fig. 1), Reed (Figs. 1 and 2) and Spriggs (Figs 1-4), however, all teach that an evaporant can be more uniformly heated and more uniformly evaporated by providing a block with wells for holding the evaporant, compared to conventional vaporizer in which the evaporant is merely placed in the bottom of the vaporizer. It would have been obvious to one skilled in the art to provide a block with wells in the sealed chamber of

Horsky in the location of Horsky's evaporant to hold the evaporant to be vaporized because Barr, Reed and Spriggs clearly teach that a block with wells for holding the evaporant will more uniformly heat an evaporant material and more uniformly evaporate the evaporant material."

Applicants submit that the Office has not provided objective or specific teachings or suggestions in the cited reference to motivate one skilled in the art to combine said references. Considering the Horsky and Barr apparatuses *as a whole*¹, it can be seen that the Barr's system describes a body member 10 with multiple cavities 14 that hold the source material. Barr describes that heat is applied rapidly to the crucible by elements 25 and 26 which are spiral resistive elements positioned above and below the body member. In contrast, Horsky uses a single cavity for the source material and this single cavity is surrounded by a heating medium to ensure constant and consistent heat to the vaporized decaborane. The Office proposes the multiple cavities of Barr can replace that of Horsky, however as stated above the Office is not allowed to pick and choose one element to the exclusion of other elements. Thus, if the cavities of Barr are included in Horsky then the Office has to accept that the resistive heating elements must also be used in the Horsky system. However, it should be noted that if the heating filaments 25 and 26 (from FIG. 1 of Barr) are placed in Horsky, then this placement above and below the chamber will cause inconsistent heating and as the vaporized decaborane passes through and by the spiral resistive heater positioned above the cavities the vaporized decaborane will be subject to increased and inconsistent heat thereby causing thermal decomposition or condensation of the decaborane. **This is the exact situation that Horsky is attempting to prevent** as evidenced from column 5, lines 50-53 of Horsky (shown below for ease of reference).

"...by maintaining a constant temperature of the vaporized decaborane during transport to the ionization chamber 58 via the heated feed tube 62, no condensation or thermal decomposition of the vapor occurs." (see Horsky, column 5, lines 50-53, emphasis added)

Thus, clearly if the teachings of Horsky and Barr are combined, then the system of Horsky will be rendered unsatisfactory for its intended use. As stated above, if proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. (See *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984)).

¹ It is incumbent on the Examiner to view applicants' claimed invention as a whole. *In re Wesslau*, 174 U.S.P.Q. 393 (CCPA 1965). Concurrently, the Examiner must consider the inventions of any cited references in their respective entireties.

Clearly, the Office seems to be merely reinterpreting the prior art in light of applicants' disclosure, in order to reconstruct applicants' claimed invention, but without any instructional or motivating basis in the references themselves. Such approach is improper and legally insufficient to establish any *prima facie* case of obviousness. As such, the proposed combination of Horsky and Barr does not meet the standard required to render the presently claimed invention *prima facie* obvious.

The Office further proposes that Horsky can be combined with Reed and the combination would render applicants' claimed invention *prima facie* obvious. Applicants disagree and submit that if the elements of the Horsky system were combined with the Reed system, then both delivery systems would no longer operate as intended. For example, the Office proposes that the multiple passages of Reed can be used to replace the single Horsky cavity. However, these double open-ended passages of Reed must be included in a chamber that is connected to a reservoir that has a gravity for molten metal to drain from the reservoir to the chamber. Clearly, if a material such as decaborane is used in this Reed setup, the sublimation of the material from a solid to vapor will cause the vapor to be trapped in the top of the reservoir and these vapors will not be able to travel down outlet 20 and thus preventing the vapors from entering into the chamber with the plurality of open ended passages. Thus, these vapors will not even reach the chamber for traveling to the ion implantation system and rendering the Horsky system inoperable as intended. This type of result is evidence that the proposed combination is improper and does not render applicants' claimed invention *prima facie* obvious.

The Office further proposes that one skilled in the art would combine the teachings of Horsky with that of Spriggs and the combination would render applicants' claimed invention *prima facie* obvious. However, applicants submit that this proposed combination suffers from the same deficiencies as that of the other proposed combination. Spriggs may teach a block consisting of multiple cavities for including source material, but this block also includes cavities positioned traverse to these source material cavities that provide for inclusion of electrical coils. However, Spriggs recognizes that this electrical coil system introduces the problems that the heating of the crucible will not be uniform and may even cause particle ejection (See column 3, line 59-column 4, line 23). Spriggs further states "temperature gradients will arise" and "temperatures will be higher (in the lower portion of the cavities) than in the regions that divide the cavities 18." Spriggs continues by stating "[i]f the temperature gradients are extreme, it will result in particle ejection or 'spitting.'" Thus, Spriggs acknowledges the various heating inconsistencies in the crucible of their invention.

On the other hand, Horsky states that precise, constant temperature control of the decaborane is crucial to their invention. This is evidenced in column 5, line 66 through column 6, line 7 wherein it is stated that:

“By controlling the circulation of the heating medium in the system (via pump 55) and the temperature of the heating medium (via heating element 80), the ion source 50 can be controlled to an operating temperature of on the order of 20°C to 150°C (+/-1°C). Precise temperature control is more critical at the crucible, as compared to the end of the feed tube nearest the ionization chamber to control the pressure of the crucible and thus the vapor flow rate out of the crucible.”

(See Horsky column 5, line 66 to column 6, line 7, emphasis added)

As stated above, the Office must consider the inventions of the cited references in their entireties to determine obviousness. Certain individual features from the references may not be chosen and merely lumped together as a mosaic in an attempt to meet the features of the rejected claims. Further, it is evident that if the multiple cavity system of Spriggs is combined with the system of Horsky the temperature inconsistencies and non-uniform heating caused by Spriggs and introduced in the Horsky system will render the Horsky system inoperable as intended. In fact, this inconsistent heating is exactly what Horsky is attempting to avoid.

Furthermore, the resultant combination of both Horsky and Spriggs undesirably employs two separate heating systems -- a circulating heating medium of Horsky and a resistive heating element of Spriggs. Both heating systems cannot function simultaneously AND maintain a constant temperature of vaporized decaborane, which is the intended operation of Horsky. The heating system of Horsky applies a constant heat to the crucible and feed tube, while the heating system of Spriggs applies heat only below some of the multiple cavities. If both heating systems are used, then the systems will be additive only at the crucible, the crucible will heat and vaporize the decaborane at a higher temperature than the rest of the system which could cause thermal decomposition of the decaborane source material. Once, the decaborane is vaporized, the temperature of the vaporized decaborane will not be maintained during transport from the crucible to the ionization chamber. This will cause condensation, which as mentioned above, is the exact situation that Horsky is attempting to prevent.

Accordingly, since there is no suggestion or motivation to combine Horsky with the Barr, Reed or Spriggs reference. The Office is requested to reconsider the rejections of claims 1-8, 10, 12-14, 25 and 26 and withdraw such rejections.

(11 and 12) Claims 9 and 11 were rejected under 35 U.S.C. §103(a) as obvious over Horsky in view of Barr, Reed and/or Spriggs in further view of Tanabe and Holloway, respectively. Regardless, of the teachings of Tanabe or Holloway, applicants respectfully submit that the defects in the alleged *prima facie* case over Horsky in view of Barr, Reed or Scriggs are not cured by the addition of Tanabe or Holloway. Withdrawal of these rejections under 35 USC 103(a) is requested.

CONCLUSION

Applicants have satisfied the requirements for patentability. All pending claims are free of the art and fully comply with the requirements of 35 U.S.C. §102 and §103. It therefore is requested that Examiner Bueker reconsider the patentability of claims 1-26 in light of the distinguishing remarks herein, and withdraw all rejections, thereby placing the application in condition for allowance. Notice of the same is earnestly solicited. In the event that any issues remain, Examiner Bueker is requested to contact the undersigned attorney at (919) 419-9350 to resolve same.

Respectfully submitted,



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APPENDIX A